AMENDMENTS TO CLAIMS

1-100. (Cancelled)

101. (Previously Presented) A method in a computing system for processing microelectronic workpieces, comprising:

using a first set of deposition control parameters to deposit material on a first workpiece;

determining a first deposition profile characterizing the material deposited on the first workpiece;

identifying differences between the first deposition profile and a target deposition profile;

using a sensitivity matrix to determine modifications to the first set of deposition control parameters predicted by the sensitivity matrix to resolve the identified differences between the first deposition profile and the target deposition profile;

constructing a second set of deposition control parameters based upon the determined modifications to the first set of deposition control parameters;

using the second set of deposition control parameters to deposit material on a second workpiece;

determining a second deposition profile characterizing the material deposited on the second workpiece;

identifying differences between the second deposition profile and the target deposition profile;

adjusting the identified differences between the second deposition profile and the target deposition profile based on a comparison of the differences between the first deposition profile and a target deposition profile to the differences between the second deposition profile and the target deposition profile;

using the sensitivity matrix to determine modifications to the second set of deposition control parameters predicted by the sensitivity matrix to resolve the adjusted

identified differences between the second deposition profile and the target deposition profile;

constructing a third set of deposition control parameters based upon the determined modifications to the third set of deposition control parameters; and

using the third set of deposition control parameters to deposit material on a third workpiece.

102. (Previously Presented) A method in a computing system for automatically configuring parameters controlling operation of an electrochemical deposition chamber to deposit material on each of a sequence of workpieces to improve conformity with a specified deposition pattern, comprising:

for each of the sequence of workpieces, measuring thicknesses of the workpiece after material is deposited on the workpiece; and

for each of the sequence of workpieces, configuring the parameters for depositing material on the workpiece based on the specified deposition pattern, the parameters used for depositing material on the previous workpiece, and the measured thicknesses of the previous workpiece after material is deposited on the previous workpiece.

103. (Original) An apparatus for automatically configuring parameters controlling operation of an electrochemical deposition chamber to deposit material on each of a sequence of workpieces to improve conformity with a specified deposition pattern, comprising:

a post-deposition measuring subsystem that measures thicknesses of material deposited on the workpiece; and

a parameter configuration subsystem that configures the parameters for depositing material on each of the sequence of workpieces based on the specified deposition pattern, the parameters used for depositing material on the previous workpiece, and the measured thicknesses of the material is deposited on the previous.

104. (Previously Presented) A computer-readable medium whose contents cause a computing system to perform a method for constructing a sensitivity matrix usable to adjust currents for a plurality of electrodes in an electroplating chamber to improve plating uniformity, the method comprising:

for each of a plurality of radii on the plating workpiece, obtaining a plating thickness on the workpiece at that radius when a set of baseline currents are delivered through the electrodes;

for each of the electrodes, for each of a plurality of plating workpiece radii, obtaining a plating thickness on the workpiece at that radius when the baseline currents are perturbed for that electrode; and

constructing a matrix, a first dimension of the matrix corresponding to the plurality of electrodes, a second dimension of the matrix corresponding to the plurality of radii, each entry for a particular electrode and a particular radius being determined by subtracting the thickness at that radius when the baseline currents are delivered through the electrodes from the thickness at that radius when the baseline currents are perturbed for that electrode, then dividing by the magnitude by which that the current for that electrode was perturbed from its baseline current.

105. (Previously Presented) A method in a computing system for constructing a sensitivity matrix usable to adjust currents for a plurality of electrodes in an electroplating chamber to improve plating uniformity, comprising:

for each of a plurality of radii on the plating workpiece, obtaining a plating thickness on the workpiece at that radius when a set of baseline currents are delivered through the electrodes;

for each of the electrodes, for each of a plurality of plating workpiece radii, obtaining a plating thickness on the workpiece at that radius when the baseline currents are perturbed for that electrode; and

constructing a matrix, a first dimension of the matrix corresponding to the plurality of electrodes, a second dimension of the matrix corresponding to the plurality of radii, each

entry for a particular electrode and a particular radius being determined by subtracting the thickness at that radius when the baseline currents are delivered through the electrodes from the thickness at that radius when the baseline currents are perturbed for that electrode, then dividing by the magnitude by which that the current for that electrode was perturbed from its baseline current.

106. (Previously Presented) The method of claim 105 wherein the current for each electrode is perturbed by approximately +.05 amps.

107. (Previously Presented) The method of claim 105 wherein the current for each electrode is perturbed by a factor in the range between 1% and 10%.

108. (Previously Presented) The method of claim 105 wherein the obtained thicknesses are obtained by executing a simulation of the operation of the electroplating chamber based upon a mathematical model of the electroplating chamber.

109. (Previously Presented) The method of claim 105 wherein the obtained thicknesses are obtained by measuring workpieces plated in the electroplating chamber.

110. (Previously Presented) The method of claim 105, further comprising repeating the method to produce additional sensitivity matrices for a variety of different conditions.

111. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different seed layer thickness than the first sensitivity matrix.

112. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different electrolyte conductivity level than the first sensitivity matrix.

113. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different substrate metal than the first sensitivity matrix.

114. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different film thickness than the first sensitivity matrix.

115. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different plating rate than the first sensitivity matrix.

116. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different contact ring geometry than the first sensitivity matrix.

117. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different wafer position relative to the chamber than the first sensitivity matrix.

118. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different electrode shape than the first sensitivity matrix.

119. (Previously Presented) The method of claim 110 wherein an additional sensitivity matrix is produced for a different current distribution than the first sensitivity matrix.

120. (Previously Presented) The method of claim 105, further comprising using the constructed sensitivity matrix to modify for use in plating a second workpiece currents used to plate a first workpiece, such that the modified currents cause the second workpiece to be plated more uniformly than the first workpiece.

121-126. (Cancelled)

127. (Previously Presented) A method in a computing system for automatically configuring parameters usable to control operation of a reaction chamber to electropolish a selected wafer to optimize conformity with a specified electropolishing pattern, comprising:

receiving pre-polishing thicknesses of the selected wafer before the selected wafer is polished;

receiving post-polishing thicknesses of an already-polished wafer after the already-polished wafer is polished;

receiving pre-polishing thicknesses of the already-polished wafer before the already-polished wafer is polished; and

selecting the parameters to be used to polish the selected wafer based on the specified polishing pattern, the pre-polishing thicknesses of the selected wafer, the pre-polishing thicknesses of the already-polished wafer, parameters used for polishing the already-polished wafer, and the post-polishing thicknesses of the already-polished wafer.

128. (Previously Presented) A method in a computing system for electroplating a microelectronic workpiece, comprising:

receiving data representing a profile of a seed layer that has been applied to the workpiece;

identifying deficiencies in the seed layer based upon the profile of the seed layer represented by the received data;

determining a set of control parameters for plating the workpiece in a manner that compensates for the identified deficiencies in the seed layer; and

communicating the determined set of control parameters to a plating tool for use in plating the workpiece.

129. (Previously Presented) The method of claim 128 wherein the determined set of control parameters is, for each of a plurality of electrodes of the plating tool, one or more current levels to be delivered through the electrode.

130. (Previously Presented) A method in a computing system for processing microelectronic workpieces, comprising:

determining a first deposition profile characterizing material deposited on a first workpiece using a first set of deposition control parameters;

identifying differences between the first deposition profile and a first target deposition profile;

using a sensitivity matrix to construct a second set of deposition control parameters in a manner responsive to the identified differences between the first deposition profile and the first target deposition profile; and

using the second set of deposition control parameters to deposit material on a workpiece.

131. (Previously Presented) The method of claim 130 wherein the first and second set of deposition control parameters specify current levels for each of a plurality of electrodes.

132. (Previously Presented) The method of claim 130 wherein the first and second set of deposition control parameters specify material deposition rates near each of a plurality of radial workpiece positions

133. (Previously Presented) The method of claim 130 wherein the second set of deposition control parameters is used to deposit material on the first workpiece.

134. (Previously Presented) The method of claim 133 wherein the second set of deposition control parameters is constructed to alter the first deposition profile to resolve the identified differences between the first deposition profile and the first target deposition profile.

135. (Previously Presented) The method of claim 134, further comprising:

determining a second deposition profile characterizing the material deposited using the second set of deposition control parameters;

identifying differences between the second deposition profile and the first target deposition profile;

using the sensitivity matrix to construct a third set of deposition control parameters in a manner responsive to the identified differences between the second deposition profile and the first target deposition profile; and

using the third set of deposition control parameters to deposit material on a workpiece.

136. (Previously Presented) The method of claim 133 wherein the second set of deposition control parameters is constructed by altering a prescribed second set of deposition control parameters intended to transform the first target deposition profile to a second target deposition profile to correct for the identified differences between the first deposition profile and the first target deposition profile.

137. (Previously Presented) The method of claim 134, further comprising:

determining a second deposition profile characterizing the material deposited using the second set of deposition control parameters;

identifying differences between the second deposition profile and the second target deposition profile;

using the sensitivity matrix to construct a third set of deposition control parameters by altering a prescribed third set of deposition control parameters intended to transform the

second target deposition profile to a third target deposition profile to correct for the identified differences between the second deposition profile and the second target deposition profile; and

using the third set of deposition control parameters to deposit material on a workpiece.

138. (Previously Presented) The method of claim 130 wherein the second set of deposition control parameters is used to deposit material on a second workpiece distinct from the first workpiece.

139. (Previously Presented) The method of claim 138 wherein the second set of deposition control parameters is constructed by altering the first set of deposition control parameters to resolve the identified differences between the first deposition profile and the first target deposition profile.

140. (Previously Presented) The method of claim 139, further comprising:

determining a second deposition profile characterizing the material deposited using the second set of deposition control parameters;

identifying differences between the second deposition profile and the first target deposition profile;

using the sensitivity matrix to construct a third set of deposition control parameters by altering the second set of deposition control parameters to resolve the identified differences between the second deposition profile and the first target deposition profile; and

using the third set of deposition control parameters to deposit material on a third workpiece.

141. (Previously Presented) A method for processing a microelectronic workpiece having a seed layer thereon, comprising:

contacting the surface of the microelectronic workpiece with an electrolytic fluid;

selecting electrical current levels for each of a plurality of electrodes immersed in the electrolytic fluid to deposit a substantially uniform layer of material on the entire surface of the seed layer;

during a processing cycle, for each of the plurality of electrodes, directing an electrical currents at the levels selected for the electrode through the electrode, through the electrolytic fluid, and to the microelectronic workpiece.

142. (Previously Presented) The method of claim 141, further comprising altering the selected electrical current levels as the seed layer changes during the processing cycle in order to uniformly deposit material electrolytically.

143. (Previously Presented) The method of claim 142 wherein the sum of the altered selected current levels is the same as the sum of the selected current levels.

144. (Previously Presented) The method of claim 141, further comprising, at each of multiple points during the processing cycle, altering the selected electrical current levels as the seed layer changes during the processing cycle in order to uniformly deposit material electrolytically.

145. (Previously Presented) The method of claim 141 wherein the selecting electrical current levels are retrieved from a data structure containing predetermined electrical current levels.

146. (Previously Presented) The method of claim 145 wherein the data structure contains predetermined electrical current levels determined for different seed layers and bath conductivities.